

What is claimed is:

1        1.    A method comprising:  
2            reducing an input argument  $x$  of a function to a range  
3 reduced value  $r$  according to a first reduction sequence;  
4            approximating a polynomial for a corresponding  
5 function of  $r$  having a dominant portion  $f(A) + \sigma r$ ; and  
6            obtaining a first result for the function using the  
7 polynomial.

1        2.    The method of claim 1, wherein the dominant  
2 portion comprises a first term  $f(A)$  and a second term  $\sigma r$ ,  
3 where  $A$  equals  $x$  minus  $r$ , and an absolute value of  $\sigma$  is a  
4 power of two.

1        3.    The method of claim 1, wherein approximating the  
2 polynomial comprises performing a plurality of successive  
3 addition/subtraction operations.

1        4.    The method of claim 1, wherein approximating the  
2 polynomial comprises using a lookup table to obtain a  
3 breakpoint for  $f(A)$ .

1        5.    The method of claim 1, further comprising  
2 restricting the input argument  $x$  to values within a  
3 predetermined window.

1        6.    The method of claim 1, further comprising  
2    restricting the input argument  $x$  to values between  $2^{-252}$  and  
3    90112.

1        7.    The method of claim 1, wherein obtaining the  
2    first result for the function comprises obtaining  $\sin(x)$ .

1        8.    The method of claim 7, further comprising  
2    obtaining a second result for the function using a second  
3    input  $y$ , wherein  $y$  is  $\pi/2$  greater than  $x$ .

1        9.    The method of claim 8, wherein obtaining the  
2    second result for the function comprises obtaining  $\cos(x)$ .

1        10.   The method of claim 9, further comprising  
2    obtaining  $\sin(x)$  and  $\cos(x)$  using a single instruction  
3    multiple data (SIMD) floating-point operation.

1        11.   The method of claim 9, further comprising  
2    obtaining the first result and the second result in  
3    parallel.

1        12.   An article comprising a machine-accessible  
2    storage medium containing instructions that if executed  
3    enable a system to:

4       reduce an input argument  $x$  of a function to a range  
5       reduced value  $r$  according to a first reduction sequence;  
6       approximate a polynomial for a corresponding function  
7       of  $r$  having a dominant portion  $f(A) + \sigma r$ ; and  
8       obtain a first result for the function using the  
9       polynomial.

1       13. The article of claim 12, further comprising  
2       instructions that if executed enable the system to  
3       approximate the polynomial wherein the dominant portion  
4       comprises a first term  $f(A)$  and a second term  $\sigma r$ , where  $A$   
5       equals  $x$  minus  $r$ , and an absolute value of  $\sigma$  is a power of  
6       two.

1       14. The article of claim 12, further comprising  
2       instructions that if executed enable the system to  
3       approximate the polynomial using a lookup table to obtain a  
4       breakpoint for  $f(A)$ .

1       15. The article of claim 12, further comprising  
2       instructions that if executed enable the system to obtain a  
3       second result for the function equal to  $\cos(x)$ , wherein the  
4       first result is equal to  $\sin(x)$ .

1       16. The article of claim 15, further comprising  
2       instructions that if executed enable the system to obtain

3    sin(x) and cos(x) using a single instruction multiple data  
4    (SIMD) floating-point operation.

1            17. The article of claim 15, further comprising  
2    instructions that if executed enable the system to obtain  
3    the first result and the second result in parallel.

1            18. A system comprising:  
2            a processor; and  
3            a dynamic random access memory coupled to the  
4    processor including instructions that if executed enable  
5    the system to reduce an input argument x of a function to a  
6    range reduced value r according to a first reduction  
7    sequence, approximate a polynomial for a corresponding  
8    function of r having a dominant portion  $f(A) + \sigma r$ , and obtain  
9    a first result for the function using the polynomial.

1            19. The system of claim 18, wherein the dynamic  
2    random access memory further includes instructions that if  
3    executed enable the system to obtain a second result for  
4    the function equal to cos(x), wherein the first result is  
5    equal to sin(x).

1            20. The system of claim 19, wherein the dynamic  
2    random access memory further includes instructions that if  
3    executed enable the system to obtain sin(x) and cos(x)

4 using a single instruction multiple data (SIMD) floating-  
5 point operation.

1        21. The system of claim 20, wherein the dynamic  
2 random access memory further includes instructions that if  
3 executed enable the system to obtain  $\sin(x)$  and  $\cos(x)$   
4 using a single instruction multiple data (SIMD) floating-  
5 point operation when a function call requests either of  
6  $\sin(x)$  or  $\cos(x)$ .

1        22. The system of claim 20, wherein the dynamic  
2 random access memory further includes instructions that if  
3 executed enable the system to obtain the first result and  
4 the second result in parallel.